

Patent Claims

1. A self-locking seatbelt retractor with a blocking element that can be triggered in a belt-sensitive and/or vehicle-sensitive manner for blocking the rotation of the belt shaft in the unwinding direction and with a tensioning drive that acts upon the belt shaft and that, upon triggering, rotates the belt shaft in the wind up direction of the security belt, characterized in that the tensioning drive, which comprises two components (14,15;26,32) that are set into relative movement relative to one another upon the triggering of the tensioning device, is arranged without a connection to the housing (10) of the seatbelt retractor on the belt shaft and rotates in common, before its triggering, with the belt shaft, and that the blocking element (17) is retained on a first component (15;20,31) that, upon triggering of the tensioning drive, initially initiates a rotation in the pull out direction and is, via the movement of the first component, controlled into its blocking position, and the belt shaft is connected with the second component (15;26) of the tensioning drive, which second component is rotated in the wind up by reason of the application of the drive force occurring in connection with the fixedly disposed first component, whereby a reverse movement stop (18,19) is arranged between the first and second components (14,15;26,20,32) of the tensioning drive

that is continuously effective in the extension direction and that runs in a free running condition in the wind up direction.

2. A seatbelt retractor according to Claim 1, characterized in that the reverse movement stop is configured as a ratchet stop with a latch (19) that moves out of ratchet engagement with a tooth arrangement (18) upon rotation in the wind up direction.

3. A seatbelt retractor according to Claim 1 or 2, characterized in that the tensioning drive is configured as an electro-motor whose stator (14) forms the shaft body that acts as a support for the seatbelt (13) in the role of the second component and whose rotor (15) that retains the blocking element (17) is in the role of the first component.

4. A seatbelt retractor according to Claim 3 with a force limiting device configured as a torsion bar, characterized in that the torsion bar (20) is arranged in the interior of the rotor (15) and is connected on its one end in a form-fitting manner with a profile head (21) serving as a support for the blocking element (17) retained thereon and is connected on its opposite end in a form-fitting connection with the rotor (15), whereby the rotor (14) is directly connected with the profile head (21) via structures designed to give way at a preset force application.

5. A seatbelt retractor according to Claim 1 or 2, characterized in that the tensioning drive is configured as a pyrotechnic drive with a housing connected to a shaft body (25) supporting the belt (13) in the role of the second component and with at least one drive piece arranged in the housing (26) that is effective on a drive shaft acting in the role as a support for the blocking element (17) and is flow-contacted by the gas produced from a gas generator (29) upon the triggering of the tensioning drive in the role of the first component.

6. A seatbelt retractor according to Claim 5, characterized in that the drive piece is configured as a piston (32) that is flow-contacted by the gas.

7. A seatbelt retractor according to Claim 6, characterized in that the drive piece is configured from a piston (32) that is flow-contacted by the gas, whereby, for the purpose of a symmetrical force transmission in the event of a triggering, it can be provided that pistons are respectively arranged on both sides of the drive shaft in a symmetrical arrangement.

8. A seatbelt retractor according to Claim 6 or 7, characterized in that the driveshaft and the piston (32) are coupled with one

another via meshing teeth in a manner such that the linear movement of the piston (32) is, upon triggering of the tensioning drive, converted into a rotational movement of the driveshaft.

- 5 9. A seatbelt retractor according to Claim 6 or 7, characterized in that there is wound onto the driveshaft a belt (33) that is guided over the piston (32) and is secured to the housing (26) such that the linear piston movement leads to an unwinding of the belt (32) from the driveshaft and, consequently, leads to a rotation of the housing (26) relative to the fixedly retained driveshaft.
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10. A seatbelt retractor according to Claim 5, characterized in that a belt (33) is wound onto the driveshaft and a pre-arched chamber, disposed in the path of the flow of the gas, is closely disposed to the housing (26) such that the flow-contacting of the belt (32) leads to an unwinding of the belt (32) from the driveshaft and, consequently, a rotation of the housing (26) relative to the fixedly set driveshaft.
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11. A seatbelt retractor according to one of the Claims 5-10 with a force limiting device configured as the torsion bar, characterized in that the driveshaft is configured as an inner disposed torsion bar (20) that is driven by the piston at its end arranged relative to the tensioning drive and is connected at its opposite end with
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a profile head (21) serving as a support of the blocking element (17), whereby the shaft body (25) is connected with the profile head (21) via structures designed to give way at a preset force application.

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12. A seatbelt retractor according to one of the Claims 5-11, characterized in that the gas generator (29) is arranged on a fixedly set cover (28) of the seatbelt retractor and extends with its gas exhaust region (34) into a partitioned gas space (30) configured in the housing (26) of the tensioning drive.

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